REMARKS

System claims 15 to 29 are pending. Applicants note that the Examiner may not have received their Preliminary Amendment filed on January 31, 2002, along with the present divisional application, because he made no reference to this Amendment in the present Office Action. As a result, the Examiner has inadvertently rejected method claims 1 to 14, which were never pending in the present application, because the Preliminary Amendment canceling these claims was filed together with the present application. Extra copies of the Preliminary Amendment and the return-receipt post card listing this Preliminary Amendment are attached for the Examiner's review and for updating the USPTO file for this case should these documents be missing from the USPTO file.

Examiner Sines allowed claims 1 to 14 in the parent (U.S.S.N. 09/491,026) of the present divisional application, which issued as U.S. Patent No. 6,406,918 ("the '918 patent"). In addition, Examiner Sines considered numerous references in allowing the '918 patent, as indicated on its face. In particular, Examiner Sines reviewed Corrigan et al., U.S. Patent No. 5,109,691 ("the Corrigan patent"), and Jones et al., J. Thermal Analysis, 44:533-546 (1995) ("the Jones article"), which he has now cited in the present Office Action. The '918 patent also cites Reading et al., "Thermal Analysis for the 21st Century," American Laboratory, TA244:13-17, Jan. 1998 ("the Reading article," which applicants have also cited in an IDS filed in the present application).[1]

Based on the unusual circumstances in the present application, applicants state for the record that even if claims 1 to 14 were presently pending, they would have been allowable, as amended in the '918 patent, over the cited prior art. For one thing, the two Reading et al. patents cited in the present Office Action (U.S. Patent Nos. 5,346,306 and 5,224,775; "the Reading

[1] The Examiner appears not to have received applicants' IDS filed on July 7, 2002, because an initialed and dated copy of form PTO 1449 did not accompany the present Office Action, and form PTO-326 does not indicate that the Examiner attached applicants' form PTO-1449. Therefore, applicants request that the Examiner either (i) indicate that the IDS is missing from the USPTO file, or (ii) review, initial, and date form PTO-1449 and include a copy with his next correspondence.

patents")[2], do not seem to add much of relevance to the Reading article already of record in both the '918 patent and in the present application.

Claim 1 as issued in the '918 patent covers a method for detecting the presence of an energetic material in a sample in which the presence of the energetic material is unknown, by heating the sample; measuring heat flow between the sample and its surrounding environment; producing a thermogram; and determining whether the energetic material is present in the sample based on whether the measured heat flow includes an exothermal peak in the thermogram. Claims 2 to 9 depend from claim 1.

Method claims 1 to 9 as issued in the '918 patent are allowable over either of the Reading patents or the Reading article, either alone or in combination with Corrigan or Jones, because the Reading patents and article do not describe the claimed methods, and the secondary references do not fill this gap. Both the Reading article and the Reading patents refer to modulated temperature differential scanning calorimetry. The Reading patents discuss this technique in greater detail than the Reading article, but the Reading article refers to this modulation technique and the basic principals and advantages (see page 13 of the Reading article). Thus, this technique was part of the prior art considered by Examiner Sines when he allowed the '918 patent. However, neither the Reading patents nor the Reading article describe a method for detecting the presence of an energetic material, e.g., an explosive material, in a sample in which the presence of the energetic material is unknown. In fact, neither of the Reading patents even mentions the words "energetic" or "explosive." The Reading patents and article describe an improvement in differential scanning calorimetry (DSC), but do not describe the claimed methods.

As Examiner Sines stated in the Notice of Allowance (November 28, 2001, page 3) in the '918 patent file history, "The cited prior art fail to teach or suggest a method incorporating a step wherein a heat output or exothermal peak response is used in the detection of the presence or identification of explosive or contraband materials." That rationale applies equally here with respect to the Reading patents (as well as the Corrigan patent and Jones article, which were also of record in the '918 patent). Thus, if claims 1 to 9 as issued in the '918 patent had been pending

[2] These two patents have essentially the same text (other than the claims) because one is a continuation of the other.

in the present application, they would have been patentable over the prior art cited in the present Office Action.

Method claim 10 as issued in the '918 patent covers a method for identifying the presence of a contraband material in a test sample in which the presence of the contraband material is unknown, by heating the test sample; measuring heat flow between the test sample and its surrounding environment to produce a test thermogram; comparing features of the test thermogram to features of reference thermograms for reference samples including known contraband materials; and identifying whether one of the known contraband materials is present in the sample based on whether there is a match between the test thermogram and one of the reference thermograms. Claims 11 to 15 depend from claim 10.[3]

Method claims 10 to 15 as issued in the '918 patent are allowable over either of the Reading patents (and the Reading article), either alone or in combination with Corrigan or Jones, because none of these references describes or suggests the claimed methods. As noted above, the Reading patents and the Reading article describe modulated temperature differential scanning calorimetry, not methods of detecting contraband materials. Corrigan may describe detecting contraband materials, but using a method that is clearly distinct from the method of claims 10 to 15 as issued in the '918 patent.

As Examiner Sines stated in the Notice of Allowance (November 28, 2001, page 3) in the '918 patent file history, "The cited prior art fail to teach or suggest identifying whether a known explosive or contraband material is present in a test sample based on whether there is match between a test thermogram and a reference thermogram." That rationale applies equally here with respect to the Reading patents (as well as the Corrigan patent and Jones article). Thus, if claims 10 to 15 as issued in the '918 patent had been pending in the present application, they would have been patentable over the prior art cited in the present Office Action.

Applicants respectfully request that Examiner Sines indicate in his next correspondence that claims 1 to 14 were inadvertently rejected here and that they would have been allowable as issued in the '918 patent over the prior art cited in the present Office Action had they been pending in this application..

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[3] Dependent claim 15 was added by amendment during prosecution of the '918 patent, and differs from presently pending claim 15.

Applicants will now address the rejections of system claims 15 to 29, which are pending in the present divisional application.

35 U.S.C. § 102

Claims 1, 2, 6, 15, and 16 have been rejected as allegedly anticipated by Reading et al. (U.S. Patent No. 5,346,306 A, the "Reading patent"). As noted above, method claims 1, 2, and 6 are not pending in this application, and thus the rejection of these claims is moot. With respect to system claims 15 and 16, applicants have amended these claims to further clarify that the system includes an analyzer that determines the presence or absence of a *strong* exothermal peak, wherein the presence of a strong exothermal peak indicates the presence of the energetic material in the sample and the absence of a strong exothermal peak indicates the absence of any energetic material in the sample. The concept of a "strong" exothermal peak, as opposed to just any size exothermal peak, is discussed throughout the application (see, e.g., page 2, lines 31-32, page 12, line 25, and page 14, lines 5-10).

With respect to claim 15, the Office Action states,

> Reading et al. anticipates a method for detecting the presence of an energetic material in a sample in which the presence of the energetic material is unknown, wherein the method comprises the steps of: heating the sample; measuring the heat flow between the sample and its surrounding environment; and analyzing the measured heat flow between the sample and its surrounding environment; wherein an exothermal peak in the measured heat flow indicates the presence of the energetic material in the sample (see entire reference).

Applicants respectfully disagree for the following reasons.

First, the Reading patent does not describe a system for detecting the presence of an energetic material in a sample in which the presence of the energetic material is unknown. The terms "energetic" and "explosive" are not present in the Reading patent, and this patent does not describe a system for detecting such materials.

Second, the Reading patent does not describe an apparatus or system that includes an analyzer that determines the presence or absence of a strong exothermal peak, wherein the presence of a strong exothermal peak indicates the presence of the energetic material

in the sample, and the absence of a strong exothermal peak indicates the absence of any energetic material in the sample.

Although the Reading patent describes the use of modulated DSC to analyze samples, such as polymers like poly(ethylene terephthalate) (PET), there is simply no discussion of a device for detecting energetic, e.g., explosive, materials. Although the device described in the Reading patent has certain elements in common with the claimed system, the difference in the claimed system is that the recited analyzer must determine "the presence or absence of a strong exothermal peak," whereas the device in the Reading patent merely analyzes heat flow without determining strong exothermal peaks. This is an important distinction, because certain materials, like PET, may exhibit small exothermic peaks during DSC when they recrystallize, but as described in the patent application, small exothermic peaks that are caused by phase or physical changes do not indicate the presence of an energetic material (see, e.g., page 11, lines 9-33). The difference between the exothermal peak of PET and that of, for example, urea nitrate, can be seen in the figures. In the Reading patent, the DSC scans in FIG. 2a indicates heat flow of PET in milliwatts. In stark contrast, the DSC thermogram of urea nitrate in the present application, e.g., in FIG. 10, shows heat flow in Watts per gram.

The exothermal peaks can also be measured in Joules per gram, as indicated in Table 1 on page 26 of the application. As Table 1 shows, most of the energetic materials have an exothermal peak of at least about 2000 Joules/gram, and even the least energetic material measured produced an exothermal peak of 447 Joules/gram. This level of energy release is far greater than the exothermal peak generated by a polymer like PET recrystallizing, which produces less than about 40 Joules/gram. As taught in the present patent application, only strong exothermal peaks indicate the presence of an energetic, e.g., explosive, material, and the Reading patent fails to describe or even suggest this concept. Thus, it is not possible that the Reading device is designed to determine such strong exothermal peaks.

As a result, claim 15, and its dependent claim 16, are not anticipated by the Reading patent, and this rejection should be withdrawn.

35 U.S.C. §103

Claims 3-5, 10, 11, 17-19, and 23-29 have been rejected as being allegedly unpatentable over the Reading patent in view of Corrigan et al. (U.S. Patent No. 5,109,691 A, "the Corrigan patent"). As noted above, method claims 3 to 5, 10, and 11 are not pending in this application, and thus the rejection of these claims is moot. With respect to system claims 17 to 19, these claims depend from independent claim 15, which is patentable for the reasons articulated above. In addition, claims 17 to 19, a well as claims 23 to 29, are all patentable for the following reasons.

The Office Action concedes that the Reading patent is "silent to the teaching of collecting sample particles from air samples," (Office Action, page 3), and looks to the Corrigan patent to add this aspect to support the rejection. The Office Action states (at page 3),

> Corrigan et al. do teach an explosives detection screening system which collects particulate matter from air samples using filters (col. 4, lines 13-33). Corrigan et al. do teach the use of laser photoacoustic detection (col. 1, lines 51-62). Therefore, it would have been obvious to one of ordinary skill in the art to utilize a collection system for collecting particles from air samples, as taught by Corrigan et al., in order to evaluate the samples using differential scanning calorimetry methodology and system, as taught by Reading et al., in order to effectively evaluate particulate samples dispersed in the air.

Applicants respectfully disagree, because there are significant reasons why one of skill in this field would not have combined Reading's DSC methods with Corrigan's collection system.

First, although the Reading patent describes that its modulated DSC can be applied to other differential analytical methods, such as differential thermal analysis and differential photocalorimetry, it does not describe or even suggest that its method can be used with a "fast response chemical analyzer which may be either a gas chromatograph/electron capture detector or an ion mobility spectrometer or both," which are the only two analyzers described in the Corrigan patent (see, e.g., column 4, lines 40-43, and column 6, lines 65-68, in Corrigan). Furthermore, the Reading patent states only that its system can be used with any automatic loading and unloading apparatus or a robotic sample changing system. There is no suggestion that the modulated DSC system should be used with a gas collecting system. Therefore, there is

simply no suggestion in the cited prior art to make the combination suggested by the Office Action.

Second, no one skilled in the field of detecting explosives would have combined the Corrigan gas collecting system with Reading modulated DSC system, because the Reading system is far too slow to be used with Corrigan's system. The Corrigan patent states that its screening process is designed for use in airports, and thus must be fast (see, e.g., column 18, lines 39-43). The two schemes described in the Corrigan patent take a total of 14.0 or 3.6 seconds for a complete screening cycle (see column 22, lines 13-17). See also Table 1. On the other hand, the Reading modulated DSC method takes a relatively long time to complete, because the sample must be heated at a gradual rate over time. For example, Reading describes heating a sample at a rate of 5 or 20°C per minute (see, e.g., column 1, line 46). Samples are typically heated from ambient temperature, e.g., 21°C, to about 300°C (see all Examples). Thus, it would take at least 56 minutes to heat a sample from 21 to 300°C using 5°C increments, and at least 14 minutes using 20°C increments. Either way, this is far too long a time period for Reading's method to work with Corrigan's collection and screening system. Thus, the references themselves teach away from the combination suggested by the Office Action. This teaching away applies to any samples, be they energetic materials or contraband materials.

Applicants also note that none of the cited references describes the use of "electrostatic precipitation" as recited in claim 18, or "solvent extraction" as recited in claim 19,[4] and thus these claims cannot be obvious.

For at least these reasons, claims 17-19 and 23-29 are patentable over the cited references, and this rejection should be withdrawn.

Next, claims 7, 8, 13, and 20-22 have been rejected as being allegedly unpatentable over Reading in view of Jones. Again, applicants respectfully traverse this rejection with respect to pending claims 20-22 (claims 7, 8, and 13 were never pending in this application).

The Office Action states, "Reading et al. is silent to the teaching of using an anaerobic environment for analysis" (at page 4), but cites Jones for the proposition that one can use an anaerobic environment in the analysis of samples using oxygen-free dry nitrogen. Therefore, the

[4] Applicants did not find the terms "electrostatic," "solvent," or "extraction" in an electronic search of the Corrigan patent.

Office Action concludes that it would have been obvious to one of ordinary skill in the art to use an anaerobic environment, as taught by Jones et al., in performing differential scanning calorimetry analysis in which such an environment would facilitate optimal measurements. The Office Action also cites Jones as disclosing "a heating step comprising the steps of heating the sample to a temperature of *at least* 350 °C or 550 °C (see figures 1-4)" (at page 4, emphasis added).

Applicants submit that Jones indeed describes the use of nitrogen in DSC, but this is standard technology. As for the temperature limits in claims 21 and 22, these temperatures are *maximum* temperatures, not minimum temperatures as the Office Action implies (claims 21 and 22 recite "no greater than about"). The idea is to prevent the sample from combusting, so the temperature has to be kept below the combustion temperature for the sample. This is also why it can be useful to exclude oxygen from the sample chamber as recited in claim 20, to prevent combustion. See page 11, lines 9-33, in the present application for this discussion. These concepts are not described in any of the cited prior art. As a result, claims 20 to 22 are patentable, and the rejection under Section 103 should be withdrawn.

CONCLUSION

All pending claims 15 to 29 are patentable, and applicants respectfully request a Notice of Allowance along with a copy of an initialed form PTO 1449, and an indication that claims 1 to 14 were inadvertently rejected here and that they would have been allowable as issued in the '918 patent over the prior art cited in the present Office Action had they been pending in this application.